WHAT IS CLAIMED IS:

1. A processing method of a semiconductor substrate, comprising steps of:

(a) preparing a semiconductor substrate; and

5 (b) processing said semiconductor substrate with irradiating a focused ion beam on a main surface of said semiconductor substrate and forming a salient part which acts as a solid immersion lens and has a curved surface on said main surface, wherein

a cutting amount of said semiconductor substrate is adjusted in said step (b) by making an irradiation time of said focused ion beam to said semiconductor substrate
10 change corresponding to an irradiation position of said focused ion beam to said semiconductor substrate.

2. The processing method of the semiconductor substrate according to claim 1, wherein

15 a surface of said salient part has a curved surface of rotation with a thickness direction of said semiconductor substrate as an axis of rotation, and

in said step (b), said focused ion beam is irradiated on said main surface of said semiconductor substrate with making said semiconductor substrate rotate with a thickness direction of said semiconductor substrate as an axis of rotation.

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3. A processing method of a semiconductor substrate, comprising steps of:

(a) preparing a semiconductor substrate; and

(b) processing said semiconductor substrate with irradiating a laser on a main surface of said semiconductor substrate in an etching gas atmosphere and forming a
25 salient part which acts as a solid immersion lens and has a curved surface on said main

surface, wherein

a cutting amount of said semiconductor substrate is adjusted in said step (b) by making an irradiation time of said laser to said semiconductor substrate change corresponding to an irradiation position of said laser to said semiconductor substrate.

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4. The processing method of the semiconductor substrate according to claim 3, wherein

a surface of said salient part has a curved surface of rotation with a thickness direction of said semiconductor substrate as an axis of rotation, and

10 in said step (b), said laser is irradiated on said main surface of said semiconductor substrate with making said semiconductor substrate rotate with a thickness direction of said semiconductor substrate as an axis of rotation.

5. A processing method of a semiconductor substrate, comprising steps of:

15 (a) preparing a semiconductor substrate; and

(b) processing said semiconductor substrate and forming a salient part which acts as a solid immersion lens and has a curved surface on a main surface of said semiconductor substrate, wherein

said step (b) includes steps of:

20 (b-1) placing a mask on said main surface of said semiconductor substrate, said mask being composed of a material of which a cutting amount per unit of time by a focused ion beam is substantially identical with that of said semiconductor substrate and having shape similar to that of said salient part; and

(b-2) irradiating said focused ion beam on said mask and said semiconductor

25 substrate from an upper side of said mask until said mask is removed and forming said

salient part on said main surface.